

## FINDING AND RECOMMENDATION(S)

Submitted by: Lake Tahoe Area Air Quality Working Group

### Finding:

In order to optimize burn windows for prescribed fire activities within the Lake Tahoe Basin, a need for more comprehensive air quality and meteorological information is necessary in order to obtain more detailed analysis of air quality conditions.

### Background and Supporting Evidence:

A more comprehensive routine evaluation of atmospheric conditions in the Lake Tahoe Air Basin may result in increased burning opportunities in both California and Nevada. Real-time monitoring of fine particulates (PM<sub>2.5</sub>), web cams, smoke dispersal modeling, and additional meteorological data can provide more specific information that can be useful in making burn day determinations and more comprehensive evaluation of atmospheric conditions for burning in both California and Nevada. The recent application of real-time PM<sub>2.5</sub> monitoring, better access to meteorological data and web cams in the Southern Sierra has resulted in additional burn days and confidence in marginal conditions through immediate feedback during burn operations. In the Sequoia National Forest, a monitoring pilot project is in use, allowing air regulators and National Forest staff to view a burn and monitor the PM<sub>2.5</sub> conditions throughout the day. The information is then used on a daily 1pm conference call between meteorologists, burn agencies and air regulators to make coordinated decisions with respect to smoke conditions and weather forecasts.

### Recommendation(s):

The Lake Tahoe Area Air Quality Working Group recommends the following technologies be implemented or further analyzed for implementation in the Basin.

1. **Real time smoke/PM<sub>2.5</sub> monitoring:** Recommend a PM<sub>2.5</sub> monitoring program be established utilizing a network of BAM and EBAM instrumentation. Based on an assessment of existing air quality monitoring equipment in the Basin, at least 3 additional BAMs and 3 EBAMs are needed. This network could be complimented by other research being performed by academic institutions (e.g. UC Davis is involved with chemical speciation of PM). The Lake Tahoe Area Air Quality Working Group (Working Group) should develop an interagency collaborative plan, which may include Tahoe Basin researchers, to support and implement a comprehensive monitoring network in the basin. A final decision on portable instrumentation (EBAMs) should be made after considering current plans to place fixed instruments in the basin. The participants of the Working Group have agreed to this concept in principle, and have started a review of prospective air monitoring sites.

2. **Web Cams:** Recommend the Lake Tahoe Area Air Quality Working Group initiate a review of existing web cam coverage in the basin and develop a plan to supplement the existing government and commercial network in order to gain adequate coverage. Web cams provide fire and air quality staff with opportunities to observe smoke behavior and evaluate transport/dispersion. A visual confirmation of smoke dispersion on a given day with marginal air quality conditions can provide greater confidence in making favorable burn decisions. In the Southern Sierra, a network of web cams has been used with much success. This inexpensive effort relies on existing microwave systems to transmit images to a dedicated server. Web cams can also serve as virtual lookouts. The Southern Sierra effort is a cooperative venture between the U.S. Forest Service and National Park Service. The images can be seen at website: <http://sierrafire.cr.usgs.gov/swfrs/> under "real time".
3. **Smoke modeling via BlueSky / CANSAC:** Recommend the California and Nevada Smoke and Air Committee (CANSAC) evaluate the specific needs associated with providing the Lake Tahoe Basin with BlueSky smoke modeling and MM5 weather forecasts with a special high resolution domain for the Basin. MM5 is a Mesoscale Meteorological Model ver. 5 developed to address small scale meteorology features. To support this recommendation the CANSAC Board of Directors should develop the implementation proposal, for California in consultation with the working group.

CANSAC members as of June 2007 includes:

- USDA Forest Service Region 5
- USDA Forest Service Pacific Southwest Research Station
- Bureau of Land Management California
- Bureau of Land Management Nevada
- National Park Service
- U.S. Fish and Wildlife Service
- California Air Resources Board
- CALFIRE
- Los Angeles County Fire Department
- San Joaquin Valley Unified Air Pollution Control District

Currently, the operational advisory group of CANSAC is investigating a prototype for the Lake Tahoe Basin.

4. **Prescribed Fire Information Reporting System (PFIRS):** The Prescribed Fire Information Reporting System (PFIRS) is under the management of the California Air Resources Board (CARB). PFIRS is near completion of what is called Phase I and is undergoing beta testing by Land Managers and Air Quality Agencies in the Lake Tahoe Basin. Nevada has agreed to use PFIRS on a trial basis for evaluation purposes. To fully benefit PFIRS and Blue Sky capabilities, PFIRS data will need to be linked to the Blue Sky products to

assist in smoke dispersion forecasting for air quality and smoke modeling. Currently, land managers and air regulators in both California and Nevada have agreed to use PFIRS. The CANSAC Board of Directors and CARB should ensure that these programs are brought together. These efforts should be coordinated with the Lake Tahoe Area Air Quality Working Group.

5. **Meteorological tools:** Recommend the Lake Tahoe Area Air Quality Working Group evaluate the current meteorological resources in the Basin to establish whether further resources are needed for prescribed fire activities, including the designation of California burn days. The Working Group will propose equipment with data that can provide finer scale forecasting with the objective of adding better and possibly additional California burn day opportunities. Meteorological resources include wind profilers (for vertical atmospheric information), remote automated weather stations (i.e. RAWs, on the ground weather) and aircraft soundings (to assess lower atmospheric stability, and detect atmospheric inversions, if present). Information gleaned by this equipment will not only benefit those that are required to burn on California burn days but those in Nevada where burn day designations are not in use.
6. **Common Website for Dissemination of Information from the Technical Tools:** While each of the technical tools alone will assist in better information for conducting prescribed fire activities, it is important to tie them in on one common website. In the Southern Sierra, the USFS, BLM and NPS all cooperate on a common website that integrates air quality data and webcams. The Working Group recommends and would provide oversight for the development and design of such a website that would incorporate all of the necessary information for decision-making. The website could be linked to the USFS site at <http://www.satguard.com/usfs4/fleet.aspx/>.

## Impacts of Implementation:

Analysis of impacts on the following factors is REQUIRED (Best Estimate):

- ☐ **Cost -- Real Time Smoke / PM2.5 Monitoring:** Capital 1<sup>st</sup> year cost of approximately \$200,000 (for 3 BAM 1020s, and 3 EBAMs with satellite modems) and \$160,000 in annual recurring costs for maintenance and data management. This does not include monitors currently in place. **Web Cams:** Microwave camera systems are approximately \$2,500 per unit with the system requiring multiple units at each site for adequate coverage. Pan/Tilt systems cost approximately \$28,000 per unit. **Smoke Modeling:** Adequate support for hardware upgrades and operational needs specifically for Lake Tahoe need to be evaluated by the CANSAC Board of Directors. **PFIRS:** CARB staff time on programming and coordinating the linkage between PFIRS and Blue Sky. **Meteorological Tools:** The cost depends on the needs as determined by the Lake Tahoe Area Air Quality Working

Group. **Common Website:** Unknown cost for web design and maintenance of a website.

- ☐ Funding source – Collaborative support for each of these technical recommendations can be explored by existing interagency groups.
- ☐ Staffing – The real time smoke / PM 2.5 task will require the addition of a dedicated monitoring technician. This technician could also serve maintenance of the web cams and met stations.
- ☐ Existing regulations and/or laws – In California, Title 17 of the California Code of Regulations Subchapter 2. Smoke Management Guidelines for Agricultural and Prescribed Burning. Interim Air Quality Policy on Wildlands and Prescribed Fires” published by the EPA on April 23, 1998, US EPA Exceptional Event Rule, published 2007. Both of the Nevada’s smoke management programs are implemented through memoranda of understanding between land managers and the respective air agency with jurisdiction.

Analysis of impacts on the following factors is OPTIONAL:

- ☐ Operational – Some risk in assuming these technologies will increase the number of California burn days. Experience suggests that it will favor additional California burn days and provide meteorological information for Nevada.
- ☐ Social – Monitoring will provide more precise information regarding public exposure to smoke. The use of the instrumentation in wildfire events, including the RAWs used for Fire Weather forecasting, and the webcams for smoke monitoring, will also give valuable information related to public impacts.
- ☐ Political – Continued coordination and collaboration with all the land managers and air quality regulators in the Tahoe Basin in order to work together to conduct prescribed fire activities while protecting public health.
- ☐ Policy – Good public policy for agencies involved in prescribed fire activities to make every effort to manage public land in balance with public health.
- ☐ Health and Safety – The recommended technical tools are essential in using the best available information in balancing public health, air quality and public safety as it relates to smoke, wildfire, and fuels issues.
- ☐ Environmental – These technologies are aimed at striking a balance in three very important environmental values: air quality, climate change and forest health. Additionally, the recommendations could also benefit regulators addressing atmospheric deposition of particles and nutrients to Lake Tahoe.
- ☐ Interagency – Implementation of these recommendations can all be accomplished through existing interagency working groups, thereby strengthening the cohesion, collaboration and cooperation of the existing groups.

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